INDEX

Acidity, soil. *See* Soil acidity. Page
AHLGREN, H. L., and HOGG, PETER G.: Environmental, Breeding, and Inheritance Studies of Hydrocyanic Acid in *Sorghum vulgare* var. *sudanense* 195–210
Alfalfa—
crown buds—
development 37
development, physiological changes due to hardening process 41–44
food reserves and their translocation to, as related to cold and drought resistance. C. O. Grandfield 33–47
physiological changes 42–43
fall cuttings—
correlation with cold resistance of roots and buds 35–36, 41–44
correlation with food reserve storage 35–36, 37–41
effect on crown-bud development 35–37
food reserves during summer and fall 37–41
hardening process, correlation with—
changes in carbohydrate content 41, 42–44
changes in nitrogen content 42
resistance to cold and drought, relation to food reserves and their translocation to crown buds. C. O. Grandfield 33–47
ALLARD, H. A.: Length-of-Day Behavior of *Nicotiana gossei* 459–464
ALLEN, H. W.: Relation Between Parasitization of Twig-Infesting Larvae of the Oriental Fruit Moth and Subsequent Infestation of Ripe Peaches 81–88
Allyl isothiocyanate—
determination from hydrolysis of sinigrin. occurrence 58, 60
Aonidiella aurantii, effectiveness against of cube resins and nicotine in petroleum spray oil 17–25
Aphids, resistance of peas to, measurement. C. D. Harrington, Ed. M. Searles, R. A. Brink, and C. Eisenhart 369–387
Apomixis, definition and terminology 226
Appalachian Forest Experiment Station, near Asheville, N. C., investigation of effect of solar radiation on forest fuels 151–175
Apple, infectious hairy root, comparison with malformation of mazzard cherry 3, 11
Arizona, sugar beet, developmental phases and chemical relations 433–445
Armoracia rusticana, resistance to clubroot, relation to mustard oil content, experiments 53–61
Arsenic excretion by Malpighian tubes of *Galleria mellonella*, *Tenebrio molitor*, and *Rhodophora florida*. Robert L. Patton 411–415
Ascorbic acid content of—
cabbage, determination methods 331–332, 334
tetraploid and diploid cabbage, comparison 330–332, 333–334
Asparagine, comparison with glycine for use in *Phycomyces* assay medium 94–95, 105
Aspartic acid, efficacy for use in *Phycomyces* assay medium 94–95
β-phenethyl isothiocyanate—
isolation from crucifers 53–54, 60
occurrence, formation, and toxicity to fungi. 60–61
BAILEY, BARBARA, and WARD, HELEN, M.: Wearing Tests on Fabric Blends of New and Reclaimed Wool Fiber 485–500
BARHAM, H. N., KRAMER, GEORGE, and REED, G. NATHAN: Influence of Various Factors on the Starch Content of Kansas-Grown Potatoes and Sweetpotatoes 395–406
BARR, C. G., and NEWCOMER, E. H.: Physiological Aspects of Tetraploidy in Cabbage 329–336
BARRETT, LEONARD I., and DOWNS, ALBERT A.: Hardwood Invasion in Pine Forests of the Piedmont Plateau 111–128
Bean— Page
hybrids, inheritance of expression of symptoms of bean mosaic virus 4, discussion 299–300
Ideal Market, inoculation with bean mosaic viruses 4 and 4A, studies 316–320
immunological studies with mosaic viruses 319–320
mosaic—
virus 4, symptom expression, inheritance. W. J. Zaumeyer and L. L. Harter 295–300
viruses—
aging in vitro 318–319
inactivation by chemicals 319, 321
viruses 4 and 4A—
comparison with other viruses infecting bean plants 321–326
differences 325
distribution 305–306, 317
distribution in infected bean plants 317
host range 315–316
infection in relation to seed transmission 316–317, 321, 323
infection of beans, symptoms 308–311, 316
infection of leaves, factors affecting 306–308
thermal inactivation 317–318
tolerance to dilution 318
plants, inoculation with bean mosaic viruses 4 and 4A, methods 306
varieties—
reaction to inoculation with bean mosaic—
virus 4 and bean virus 1 311–315
viruses 4 and 4A 311–315
susceptibility to infection of bean mosaic viruses 4 and 4A, inoculation studies 306–308, 311–315
virus diseases, two new. W. J. Zaumeyer and L. L. Harter 305–328
Beans—
lima, reaction to bean mosaic viruses 4 and 4A 315
viruses affecting, separation 320–321
Beech-birch-maple-hemlock virgin forests in northern Pennsylvania, structure and growth. H. Arthur Meyer and Donald D. Stevenson 465–484
Beta vulgaris. *See* Sugar beet.
Birch-beech-maple-hemlock virgin forests in northern Pennsylvania, structure and growth. H. Arthur Meyer and Donald D. Stevenson 465–484
Blackberries, citric and isocitric acid in, occurrence. A. L. Curl and E. K. Nelson 301–303
Blackstrap molasses. *See* Molasses, blackstrap.
Bluegrass, Kentucky—
albino seedlings, occurrence 244
breeding, practical considerations 260–261
cytological studies 244–246
morphological variability—
correlation studies 237–241
nature and extent 258–260
plants from single-embryo seed and from polyembryo seed, comparative variability 241–242
progenies—
aberrant plants in 242–246
of 115 parental plants, analysis 236–237
representative, description 246–256
self-pollinated and open-pollinated, analysis 231–235, 256–257
seed formation type as indicated by nature and extent of variation in, and its practical implications. William H. Brittingham 225–264
seed set under bag 230–231
See also *Poa pratensis*.
Brassica—
alba, resistance to clubroot, relation to mustard oil content, experiments 53–61

Brassica—Continued. Page
nigra. *See* Mustard, black.
oleracea—
capitata, tetraploidy in, physiological aspects ... 330–335
var. *capitata*. *See* Cabbage.
rapa. *See* Turnip.
Breeding, effects on hydrocyanic acid in *Sorghum vulgare* var. *sudanense*, studies. Peter G. Hogg and H. L. Ahlgren ... 195–210
BRIGGS, H. M., and HELLER, V. G.: The Effect of Adding Blackstrap Molasses, Potassium Salts, Sucrose, and Corn Sirup to a Lamb-Fattening Ration ... 359–367
BRINK, R. A., HARRINGTON, C. D., SEARLES, ED. M., and EISENHART, C.: Measurement of the Resistance of Peas to Aphids ... 369–387
BRITTINGHAM, WILLIAM H.: Type of Seed Formation as Indicated by the Nature and Extent of Variation in Kentucky Bluegrass, and Its Practical Implications ... 225–264
BYRAM, GEORGE M., and JEMISON, GEORGE M.: Solar Radiation and Forest Fuel Moisture ... 149–176

Cabbage—
ascorbic acid content, determination methods ... 331–332, 334
autotetraploid, nutritional constituents, comparison with diploid ... 329–335
carbohydrate content, determination methods ... 330, 332
diploid—
ascorbic acid content, comparison with tetraploid ... 333–334
carbohydrate content, comparison with tetraploid ... 333, 334
chemical composition, comparison with tetraploid ... 333–334
nitrogen content, comparison with tetraploid ... 333, 334–335
nutritional constituents, comparison with autotetraploid ... 329–335
nitrogen content, determination methods ... 331, 334
resistance to clubroot, relation to mustard oil content, experiments ... 53–61
tetraploid—
ascorbic acid content, comparison with diploid ... 333–334
carbohydrate content, comparison with diploid ... 333–334
chemical composition, comparison with diploid ... 333–334
growth characteristics ... 330–331
nitrogen content, comparison with diploid ... 333, 334–335
tetraploidy in, physiological aspects. C. G. Barr and E. H. Newcomer ... 329–336
Carassius auratus, toxicity of rotenone and phenol to, effect of change of temperature, experiments ... 65–80
Carbohydrate content of—
alfalfa plants at different dates ... 39–41
cabbage, determination methods ... 331, 332
tetraploid and diploid cabbage, comparison ... 330–331, 332–334
Carolina and Virginia Piedmont Plateau, pine forests, invasion by hardwood, studies ... 111–127
Carya spp., invasion of pine forests of Piedmont Plateau ... 113–127
CHANDLER, RAY C.: Some Chemical Relations in the Sugar Beet During Phases of Its Development ... 433–445
Cherry, mazzard—
inoculation with infectious hairy root organism ... 3
malformation, comparison with infectious hairy root of apple ... 3, 11
seedlings having excessive roots at collar region—
adventive root primordia, formation ... 7–11, 14–15
anatomical and other studies. E. A. Siegler ... 1–16
lateral roots, origin and development ... 6–7, 11–14
pathological experiments ... 3
vascular arrangement ... 4, 11–14
Chickens—
body size, measurement ... 448–449

Chickens—Continued. Page
breeding for size—
genetic variability, estimates ... 452–454
results of crossing lines ... 451–452
selection, basis ... 449
selection, results ... 450–451
shank length variance, analysis ... 454–456
Single-Comb White Leghorn, size, inheritance. I. Michael Lerner ... 447–457
size inheritance, experiments with Single-Comb White Leghorns ... 447–456
Chlorochroa sayi, ability to damage sugar beets grown for seed, comparison with *Lygus* spp. ... 389–394
Citric acid, occurrence in blackberries and dewberry hybrids. A. L. Curl and E. K. Nelson ... 301–303
CLAGETT, CARL O., TOTTINGHAM, W. E., NAGY, RUDOLPH, ROSS, A. FRANK, and MAREK, JERRY W.: A Primary Cause of Darkening in Boiled Potatoes as Revealed by Greenhouse Cultures ... 177–193
Cleistogamy in *Lespedeza stipulacea*. Clarence H. Hanson ... 265–272
Clubroot, resistance of crucifers to and relation to mustard oil content. Mark A. Stahmann, Karl Paul Link, and J. C. Walker ... 49–63
Cold resistance in alfalfa, relation to food reserves and their translocation to crown buds. C. O. Grandfield ... 33–47
Colorado, rainfall, net, under conifer forest, determination methods ... 502–512
Colorimeter, ice, description and use ... 153
Conifer forest. *See* Forest, conifer.
Conifers. *See* Pine; *Pinus*.
Corn—
sirup, adding to lamb-fattening ration, effect. H. M. Briggs and V. G. Heller ... 359–367
sweet—
ear components, yields, effect of stand irregularities on ... 217–222
maturity, relation to type of stand ... 223–224
stand irregularity and its relation to yields. W. A. Huelsen ... 211–224
yields—
comparison between uniform and missing hill stands ... 222
relation to stand irregularity, study, experimental results ... 214–224
relation to stand irregularity, study, plan of experiment and statistical methods ... 211–214
CRESSMAN, A. W.: Effectiveness Against the California Red Scale of Cube Resins and Nicotine in Petroleum Spray Oil ... 17–26
Crown gall, thiamine in, measurement with *Phycomyces* assay. Berch W. Henry, A. J. Riker, and B. M. Duggar ... 89–110
Crucifer root tissue, myrosin activity ... 57–60
Crucifers—
mustard—
oil enzyme system, determinations ... 57
oils in and their relation to resistance to clubroot. Mark A. Stahmann, Karl Paul Link, and J. C. Walker ... 49–63
plant tissue, mustard oil content—
qualitative relation to clubroot resistance ... 52–54
quantitative estimation ... 54–56
Cube resins in petroleum spray oil, effectiveness against California red scale. A. W. Cressman ... 17–26
CURL, A. L., and NELSON, E. K.: The Occurrence of Citric and Isocitric Acid in Blackberries and in Dewberry Hybrids ... 301–303

Damping-off—
fungi—
activity, effect of—
changing weather ... 427–429
temperature, moisture, and soil reaction ... 273–292
life history and distribution ... 129–147
nature of and factors affecting, discussion ... 290–291
of red pine seedlings—
by *Pythium* and *Rhizoctonia*, influence of temperature, moisture, and soil reaction on. L. F. Roth and A. J. Riker ... 273–293

Damping-off—Continued. Page
of red pine seedlings—continued.
caused by *Pythium* and *Rhizoctonia*, seasonal development in nursery. L. F. Roth and A. J. Riker 417-431
life history and distribution of *Pythium* and *Rhizoctonia* in relation to. L. F. Roth and A. J. Riker 120-148
symptoms 132-135
See also *Pythium*; *Rhizoctonia*; and under Pine, red.
Day length, effect on behavior of *Nicotiana gossei*. H. A. Allard 459-464
Dewberry hybrids, citric and isocitric acid in, occurrence. A. L. Curl and E. K. Nelson 301-303
Digestibility of blackstrap molasses, potassium salts, sucrose, and corn sirup in lamb-fattening ration 359-366
DOWNS, ALBERT A., and BARRETT, LEONARD I.: Hardwood Invasion in Pine Forests of the Piedmont Plateau 111-128
Drought—
effect on hydrocyanic acid content of Sudan grass 199
resistance in alfalfa, relation to food reserves and their translocation to crown buds. C. O. Grandfield 33-47
DUGGAR, B. M., HENRY, BERCH W., and RIKER, A. J.: Thiamine in Crown Gall as Measured With the *Phycomyces* Assay 89-110
Durrin, inheritance in Sudan grass, study 195, 208

EISENHART, C., HARRINGTON, C. D., SEARLES, ED. M., and BRINK, R. A.: Measurement of the Resistance of Peas to Aphids 360-387
Embryo sac development in *Lespedeza stipulacea*. Clarence H. Hanson 265-272
Environment, effects on—
hydrocyanic acid in *Sorghum vulgare* var. *sudanense*, studies. Peter G. Hogg and H. L. Ahlgren 195-210
proportion of normal plum pollen 347-349
Enzyme systems in sugar beet, control of chemical processes 444

Fabric blends, new and reclaimed wool fiber, wearing tests. Helen M. Ward and Barbara Bailey 485-500
Fat digestion by lambs, effect of blackstrap molasses, potassium salts, sucrose, and corn sirup 365
Fiber—
crude, digestion by lambs, effect of blackstrap molasses, potassium salts, sucrose, and corn sirup 365-366
wool, new, and reclaimed fabric blends of, wearing test. Helen M. Ward and Barbara Bailey 485-500
Fires, forest. *See* Forest fire.
Flannels—
dyed—
after storage, physical-test data 492-493, 499
physical-test data 489-491, 498-499
wearing tests 487-499
FLORY, W. S., JR., and TOMES, M. L.: Studies of Plum Pollen, Its Appearance and Germination 337-358
Food reserves in alfalfa, and their translocation to the crown buds as related to cold and drought resistance. C. O. Grandfield 33-47
Forest—
conifer—
cutting intensity, influence upon net rainfall under 502-512
net rainfall under, determination. H. G. Wilm 501-512
fire, danger rating—
improved method 149-175
significance and application 171-174
fuel, moisture—
and solar radiation. George M. Byram and George M. Jemison 149-176
equilibrium, relation to solar radiation, determination 158-165
relations of radiation, humidity, and wind to 160-164
fuels—
drying rate, relation to solar radiation 167-171
irradiated, moisture equilibria, effect of wind on 164-166

Forests—Continued. Page
litter, influence of solar radiation on, study 149-175
nurseries, red pine seedlings, damping-off, seasonal development 417-431
seedlings, damping-off, studies 273-292, 417-431
virgin, number of trees, distribution by diameter classes 468-471
Forests—
of Piedmont Plateau, description of stands, stumpage values, and effect of agriculture 111-112
virgin—
beech-birch-maple-hemlock, structure and growth in northern Pennsylvania. H. Arthur Meyer and Donald D. Stevenson 465-484
growth data 480, 482
structural types 476-479
structure, study 468-479
Fraser Experimental Forest, Fraser, Colo., rainfall determination 502-512
Fruit moth, oriental, twig-infesting larvae, parasitization, relation to subsequent infestation of ripe peaches. H. W. Allen 81-88
Fuel, forest. *See* Forest fuel.
Fungi, damping-off. *See* Damping-off fungi.

Galleria mellonella, Malpighian tubes, arsenic excretion by. Robert L. Patton 411-415
Garments, wool flannel—
physical measurements 487-488
wear, effect on breaking strength 487, 493-498
GERSDORFF, W. A.: Effect of Change of Temperature on Relative Toxicity of Rotenone and Phenol 65
Glucoside, cyanogenetic, content of Sudan grass, environmental, breeding, and inheritance studies 195-209
Glycine, comparison with asparagine for use in *Phycomyces* assay medium 94-95, 105
Goldfish, toxicity of rotenone and phenol, effect of change of temperature, experiment 65-80
GRANDFIELD, C. O.: Food Reserves and Their Translocation to the Crown Buds as Related to Cold and Drought Resistance in Alfalfa 33-47
Grapholitha molesta, twig-infesting larvae, parasitization, relation to subsequent infestation of ripe peaches 81-88

HANSON, CLARENCE H.: Cleistogamy and the Development of the Embryo Sac in *Lespedeza stipulacea* 265-272
Hardwood invasion in pine forests of Piedmont Plateau. Leonard I. Barrett and Albert A. Downs 111-128
HARRINGTON, C. D., SEARLES, ED. M., BRINK, R. A., and EISENHART, C.: Measurement of the Resistance of Peas to Aphids 360-387
HARTER, L. L., and ZAUMEYER, W. J.: Inheritance of Symptom Expression of Bean Mosaic Virus 4 295-300
Two New Virus Diseases of Beans 305-328
HELLER, V. G., and BRIGGS, H. M.: The Effect of Adding Blackstrap Molasses, Potassium Salts, Sucrose, and Corn Sirup to a Lamb-Fattening Ration 359-367
Hemlock-beech-birch-maple virgin forests in northern Pennsylvania, structure and growth. H. Arthur Meyer and Donald D. Stevenson 465-484
HENRY, BERCH W., RIKER, A. J., and DUGGAR, B. M.: Thiamine in Crown Gall as Measured With the *Phycomyces* Assay 89-110
Hessian fly, resistance to in Dawson wheat, two genetic factors for, differentiation. W. B. Noble and C. A. Suneson 27-32
Hickory, invasion of pine forests of Piedmont Plateau 113-117
HILLS, ORIN A.: Comparative Ability of Several Species of *Lygus* and the Say Stinkbug To Damage Sugar Beets Grown From Seed 389-394
HOGG, PETER G., and AHLGREN, H. L.: Environmental, Breeding, and Inheritance Studies of Hydrocyanic Acid in *Sorghum vulgare* var. *sudanense* 195-210

	Page
Horseradish, resistance to clubroot, relation to mustard oil content, experiments	53–61
HUELSEN, W. A.: Stand Irregularity and its Relation to the Yields of Sweet Corn	211–224
Humidity, air, effect upon damping-off of red pine seedlings, experiments	284–285, 427, 488
Hydrocyanic acid—	
in *Sorghum vulgare* var. *sudanense*, environmental, breeding, and inheritance studies. Peter G. Hogg and H. L. Ahlgren	195–210
inheritance in Sudan grass, experiments	206–208
Inheritance of—	
hydrocyanic acid in *Sorghum vulgare* var. *sudanense*, studies. Peter G. Hogg and H. L. Ahlgren	195–210
size in Single-Comb White Leghorns. I. Michael Lerner	447–457
symptom expression of bean mosaic virus 4. W. J. Zaumeyer and L. L. Harter	295–300
Insecticides, efficacy against California red scale on lemon trees, experiments	17–25
Insects, Malpighian system, factor in resistance to arsenic poisoning, experiments	411–415
Isocitric acid, occurrence in blackberries and dewberry hybrids. A. L. Curl and E. K. Nelson	301–303
JEMISON, GEORGE M., and BYRAM, GEORGE M.: Solar Radiation and Forest Fuel Moisture	149–176
Kansas, potatoes and sweetpotatoes grown in, influence of various factors on starch content. H. N. Barham, George Kramer, and G. Nathan Reed	395–406
KINCAID, RANDALL R.: Effect of Storage Conditions on the Viability of Tobacco Seed	407–410
KRAMER, GEORGE, BARHAM, H. N., and REED, G. NATHAN: Influence of Various Factors on the Starch Content of Kansas-Grown Potatoes and Sweetpotatoes	395–406
Lamb-fattening ration, adding blackstrap molasses, potassium salts, sucrose, and corn sirup to, effect. H. M. Briggs and V. G. Heller	359–367
Lambs—	
digestion—	
of crude fiber, effect of blackstrap molasses, potassium salts, sucrose, and corn sirup	365–366
of fat, effect of blackstrap molasses, potassium salts, sucrose, and corn sirup	365
of nitrogen-free extract, effect of blackstrap molasses, potassium salts, sucrose, and corn sirup	366
of protein, effect of blackstrap molasses, potassium salts, sucrose, and corn sirup	363–365
trials, procedure	360–361
trials, results	361–363
fattening, effects of sugar and potassium salts in ration	359–366
Larvae of oriental fruit moth, twig-infesting, parasitization, relation to infestation of ripe peaches. H. W. Allen	81–88
Legumes, resistance to bean mosaic viruses 4 and 4A	315–316
Lemon trees, spraying for control of California red scale, experiments	17–25
LERNER, I. MICHAEL: Inheritance of Size in Single-Comb White Leghorns	447–457
Lespedeza, Korean. See *Lespedeza stipulacea*.	
Lespedeza stipulacea—	
cleistogamy and development of embryo sac. Clarence H. Hanson	265–272
floral morphology, studies	266–270
flower formation, factors affecting	270–271
flowering, effects of temperature, determination	266
flowers—	
gross morphology	266–269
petaliferous and apetalous, proportion, effect of environment	270–271
pollination studies	269, 271
megagametophyte development, description	269–270
ovule, development, description	269
Light, effect upon development of *Nicotiana gossei*, experiments	459–464
Liming, soil, effect upon damping-off fungi, experiments	423, 425–426
LINK, KARL PAUL, STAHMANN, MARK A., and WALKER, J. C.: Mustard Oils in Crucifers and Their Relation to Resistance to Clubroot	49–63
Livestock, poisoning by Sudan grass, prevention, study	195
Lygus—	
elisus, ability to damage sugar beets grown for seed, comparison with *Chlorochroa sayi*	389–394
hesperus, ability to damage sugar beets grown for seed, comparison with *Chlorochroa sayi*	389–394
oblineatus, ability to damage sugar beets grown for seed, comparison with *Chlorochroa sayi*	389–394
species, ability to damage sugar beets grown for seed, comparison with Say stinkbug. Orin A. Hills	389–394
Macrosiphum (*Illinoia*) *pisi*. *See* Pea aphid.	
Malpighian tubes, arsenic excretion in *Galleria mellonella*, *Tenebrio molitor*, and *Rhodophora florida*. Robert L. Patton	411–415
Maple-beech-birch-hemlock virgin forests in northern Pennsylvania, structure and growth. H. Arthur Meyer and Donald D. Stevenson	465–484
MARKE, JERRY W., TOTTINGHAM, W. E., NAGY, RUDOLPH, ROSS, A. FRANK, and CLAGETT, CARL O.: A Primary Cause of Darkening in Boiled Potatoes as Revealed by Greenhouse Cultures	177–193
Marmor laesiofaciens n. sp.—	
infection of beans, study	305–327
var. *minor* var. nov., infection of beans, study	305–327
Medicago sativa. *See* Alfalfa.	
MEYER, H. ARTHUR, and STEVENSON, DONALD D.: The Structure and Growth of Virgin Beech-Birch-Maple-Hemlock Forests in Northern Pennsylvania	465–484
Moisture—	
forest-fuel. *See* Forest fuel, moisture.	
influence on damping-off of red pine seedlings by *Pythium* and *Rhizoctonia*. L. F. Roth and A. J. Riker	273–293
Molasses, blackstrap—	
adding to lamb-fattening ration, effect. H. M. Briggs and V. G. Heller	359–367
feeding to lambs, digestibility studies	359–366
Mosaic—	
of beans. *See* Bean mosaic.	
viruses, 4 and 4A, susceptibility of bean varieties to	306–308, 311–315
Mustard—	
black—	
resistance to clubroot, relation to mustard oil content, experiments	53–61
root tissue, myrosin activity, determination	58–60
seed, allyl isothiocyanate analysis, methods	58
oil—	
content of crucifer plant tissues, relation to disease resistance	56–57
enzyme system in crucifers	57
oils—	
extracted from crucifers—	
characterization	51
synthesis	52
in crucifer plant tissues, quantitative estimation	54–56
in crucifers—	
and their relation to resistance to clubroot. Mark A. Stahmann, Karl Paul Link, and J. C. Walker	49–63
qualitative relationship to clubroot resistance, studies	52–54
isolation from crucifers, procedure	50–51
white, resistance to clubroot, relation to mustard oil content, experiments	53–61
Myrosin activity of crucifer root tissue, studies	57–60

Page

NAGY, REDOLPH, TOTTINGHAM, W. E., ROSS, A. FRANK, MAREK, JERRY W., and CLAGETT, CARL O.: A Primary Cause of Darkening in Boiled Potatoes as Revealed by Greenhouse Cultures ... 177–193

NELSON, E. K., and CURL, A. L.: The Occurrence of Citric and Isocitric Acid in Blackberries and in Dewberry Hybrids ... 301–303

NEWCOMER, E. H., and BARR, C. G.: Physiological Aspects of Tetraploidy in Cabbage ... 329–336

Nicotiana gossei, length-of-day behavior. H. A. Allard ... 459–464

Nicotine in petroleum spray oil, effectiveness against California red scale. A. W. Cressman ... 17–26

Nitrate nitrogen, trend and concentration in sugar beets ... 439–440, 443–444

Nitrogen—
content of—
alfalfa plants at different dates ... 40–41, 42
cabbage, determination methods ... 330, 334, 335
tetraploid and diploid cabbage, comparison ... 330–331, 332–333, 334–335
for *Phycomyces* assay, source ... 93–95
free extract, digestion by lambs, effect of blackstrap molasses, potassium salts, sucrose, and corn sirup ... 366
migration from sugar beet roots ... 438, 443
utilization by sugar beet ... 443–444

NOBLE, W. B., and SUMERSON, C. A.: Differentiation of the Two Genetic Factors for Resistance to the Hessian Fly in Dawson Wheat ... 27–32

Oaks, invasion of pine forests of Piedmont Plateau ... 113–127

Oil—
sprays, effectiveness against California red scale on lemon trees, experiments ... 17–25
See under specific kind.

PATTON, ROBERT L.: The Excretion of Arsenic by the Malpighian Tubes of *Galleria mellonella*, *Tenebrio molitor*, and *Rhodophora florida* ... 411–415

Pea—
aphid—
host-parasite relationship ... 370
reproduction, temperature factor ... 370–371
varieties, resistance to aphids, experiments ... 378–386
Peaches, ripe, infestation by oriental fruit moth, relation to parasitization of twig-infesting larvae. H. W. Allen ... 81–88
Peas, resistance to aphids—
detection and measurement, new technique ... 369–387
extent ... 386
measurement. C. D. Harrington, Ed. M. Searles, R. A. Brink, and C. Eisenhart ... 369–387
Pennsylvania, northern, beech-birch-maple-hemlock virgin forests in, structure and growth. H. Arthur Meyer and Donald D. Stevenson ... 465–484
Petroleum spray oil—
cube resins in, effectiveness against California red scale. A. W. Cressman ... 17–26
nicotine in, effectiveness against California red scale. A. W. Cressman ... 17–26
Phaseolus vulgaris. *See* Bean.
Phenol, toxicity—
at various temperature levels, comparison with rotenone ... 76–79
relative—
correlation with temperature, statistical analysis ... 72–75
effect of change of temperature. W. A. Gersdorff ... 65–80
to goldfish—
quantitative comparison with rotenone ... 71
relation to temperature ... 66–71
Photoperiodism in *Nicotiana gossei*, study ... 459–464
Phycomyces—
assay, use in measurement of thiamine in crown gall. Bereh W. Henry, A. J. Riker, and B. M. Duggar ... 89–110
blakesleeanus, use in quantitative test for thiamine ... 89–108

Phycomyces—Continued. Page
method for determination of thiamine in—
crown gall, adaptation ... 93–100
crown gall, test ... 91–93
Phytomonas tumefaciens—
cause of crown gall ... 89
cultures, attenuated and virulent, thiamine content, comparison ... 105
virulent and partly attenuated strains, thiamine content, comparison ... 105
Phytophaga destructor, resistance to in Dawson wheat, two genetic factors for, differentiation ... 27–32
Piedmont Plateau—
forests, description of stands, stumpage values and effect of agriculture ... 111–112
pine forests, hardwood invasion. Leonard I. Barrett and Albert A. Downs ... 111–128
Pine—
forests—
invasion by hardwood, study methods ... 113–115
management for control of hardwood invasion ... 123–126
of Piedmont Plateau, hardwood invasion. Leonard I. Barrett and Albert A. Downs ... 111–128
importance in piedmont forest enterprises ... 111–112
loblolly—
hardwood understories, study in Piedmont Plateau ... 113–127
net rainfall under, determinations ... 502–512
red—
damping-off—
causal organisms, identification ... 131–132
causal organisms, isolation and pathogenicity studies ... 130–131
development, experimental materials and methods ... 273–274, 418–421, 422–423
development, experimental results ... 421–422, 423–429
seed, germination, effect of *Pythium* and *Rhizoctonia*, experiments ... 276–277
seedlings—
age, effect upon susceptibility to damping-off ... 429
damping-off by *Pythium* and *Rhizoctonia*, influence of temperature, moisture, and soil reaction on. L. F. Roth and A. J. Riker ... 273–293
damping-off caused by *Pythium* and *Rhizoctonia*, seasonal development in nursery. L. F. Roth and A. J. Riker ... 417–431
damping-off, development, environmental factors ... 290–291, 418, 429–430
damping-off relation to life history and distribution of *Pythium* and *Rhizoctonia*. L. F Roth and A. J. Riker ... 120–148
mechanical injury, relation to fungus penetration ... 136–137
shortleaf, hardwood understories, studies in Piedmont Plateau ... 113–127
stands—
burned, invasion by hardwood ... 121–122, 126–127
unburned, invasion by hardwood ... 115–121, 126
Pinus—
contorta latifolia, net rainfall under, determinations ... 502–512
echinata, hardwood understories, study in Piedmont Plateau ... 113–127
resinosa. *See* Pine, red.
taeda, hardwood understories, study in Piedmont Plateau ... 113–127
Plasmodiophora brassicae, cause of clubroot of crucifers ... 49
Plum—
growing, breeding problems in Texas ... 337
pollen—
appearance and germination studies. W. S. Flory, Jr., and M. L. Tomes ... 337–368
from derivatives of single species, comparisons with pollen in interspecific hybrids ... 349–353
germination tests ... 353–356
normal—
and aborted, studies based on microscopic appearance ... 342–353
percentage in different varieties and species ... 346–347
percentages ... 338–339

Page

Plum—Continued.
pollen—continued.
normal—continued.
proportion, effect of environment 347-349
sample, adequacy, factors affecting 342-346
studies in Texas—
materials 338-340
methods 340-342
varieties, hybrid, pollen, comparison 351-353
Poa—
pratensis—
sterility and fertility, discussion 256
See also Bluegrass, Kentucky.
spp., offspring, origin 257-258
Poisoning, livestock, by Sudan grass, prevention study 195
Pollen, plum. *See* Plum pollen.
Polyploidy, physiological consequences, historical review 329-330
Potassium salts, adding to lamb-fattening ration, effect. H. M. Briggs and V. G. Heller 359-367
Potato—
tuber discoloration after boiling, in relation to climatic and fertility variations, studies .. 178-193
tubers, darkening after cooking—
experiments with bed plantings 179-183
experiments with pot cultures 15, 192
varieties—
starch content, influence of variety, harvest period, and soil type, experiments. 404-405
tuber darkening after cooking—
experiments with bed plantings 179-183
experiments with pot cultures 183-192
Potatoes—
boiled, darkening, primary cause as revealed by greenhouse cultures. W. E. Tottingham, Rudolph Nagy, A. Frank Ross, Jerry W. Marek, and Carl O. Clagett 177-193
Kansas-grown, starch content, influence of various factors. H. N. Barham, George Kramer, and G. Nathan Reed 395-406
shed storage, effects on starch content, comparison with cold storage 397-398, 401-404, 405-406
starch content, determination 398-401
storage, effects on starch content, studies .. 397-398, 401-404, 405-406
Protein, digestion by lambs, effect of blackstrap molasses, potassium salts, sucrose, and corn sirup 363-365
Prunus—
avium. *See* Cherry, mazzard.
spp., American, Asiatic, and European, pollen, comparison 350-353
Pythium—
cause of damping-off of conifer seedlings .. 132-135
damping-off of red pine seedlings—
by influence of temperature, moisture, and soil reaction on. L. F. Roth and A. J. Riker 273-293
caused by seasonal development in nursery. L. F. Roth and A. J. Riker .. 417-431
growth on red pine seedlings, effect of—
atmospheric humidity, experiments 284-285, 427, 428
soil acidity, experiments 285-290, 423, 426, 427
soil moisture, experiments 281-284, 421, 422, 426, 427, 428
temperature, experiments 275-281, 421-422, 426, 427, 428-429
inoculation of red pine seed, effect on germination, experiments 276-277
life history—
and distribution, relation to damping-off of red pine seedlings. L. F. Roth and A. J. Riker 129-148
in relation to pathogenesis on red pine seedlings 135-141
location within and exit from host and dissemination to new host 137-138
longevity and overwintering 138-141
penetration into—
and parasitism in red pine seedlings 135-136
red pine seedlings, relation to mechanical injury 136-137
sp., cause of damping-off of red pine seedlings 131
symptoms on red pine seedlings 132-135

Page

Quercus spp., invasion of pine forests of Piedmont Plateau 113-127

Radiation, solar—
and forest fuel moisture. George M. Byram and George M. Jemison 149-176
influence on moisture equilibria and drying rates of forest fuels, study 151-175
intensity, measurement 153-158
relation to—
equilibrium fuel moisture, determination 158-165
rate of drying of forest fuels 167-171
values in Wisconsin, 1934-39 179
Rainfall, net—
analysis methods 506-507
per storm under conifer forest, results of cutting 507-511
under conifer forest, determination. H. G. Wilm 501-512
variations, sources and sampling methods. 503-506
Ration, lamb-fattening, effect of adding blackstrap molasses, potassium salts, sucrose, and corn sirup. H. M. Briggs and V. G. Heller 359-367
REED, G. NATHAN, BARHAM, H. N., and KRAMER, GEORGE: Influence of Various Factors on the Starch Content of Kansas-Grown Potatoes and Sweetpotatoes 395-406
Rhizoctonia—
cause of damping-off of conifer seedlings .. 132-135
damping-off of red pine seedlings—
by, influence of temperature, moisture, and soil reaction on. L. F. Roth and A. J. Riker 273-293
caused by, seasonal development in nursery. L. F. Roth and A. J. Riker. 417-431
growth on red pine seedlings, effect of—
atmospheric humidity, experiments 284-285, 427, 428
soil acidity, experiments 285-290, 423, 426, 427
soil moisture, experiments 281-284, 421, 422, 426, 427, 428
temperature, experiments 275-281, 421-422, 426, 427, 428-429
inoculation of red pine seed, effect on germination, experiments 276-277
life history—
and distribution, relation to damping-off of red pine seedlings. L. F. Roth and A. J. Riker 129-148
in relation to pathogenesis on red pine seedlings 135-141
location within and exit from host and dissemination to new host 137-138
longevity and overwintering 138-141
penetration into—
and parasitism in red pine seedlings 135-136
red pine seedlings, relation to mechanical injury 136-137
sp., cause of damping-off of red pine seedlings 131-132
symptoms on red pine seedlings 132-135
Rhodophora florida, Malpighian tubes, arsenic excretion by. Robert L. Patton 411-415
RIKER, A. J.
and ROTH, L. F:
Influence of Temperature, Moisture, and Soil Reaction on the Damping-Off of Red Pine Seedlings by *Pythium* and *Rhizoctonia* 273-293
Life History and Distribution of *Pythium* and *Rhizoctonia* in Relation to Damping-Off of Red Pine Seedlings 129-148
Seasonal Development in the Nursery of Damping-Off of Red Pine Seedlings Caused by *Pythium* and *Rhizoctonia* .. 417-431
HENRY, BERCH W., and DUGGAR, B. M.: Thiamine in Crown Gall as Measured With the *Phycomyces* Assay 89-110
Rocky Mountain Forest and Range Experiment Station, Fraser, Colo., rainfall determination 502
Roots, excessive, at collar region of mazzard cherry seedlings, anatomical and other studies. E. A. Siegler 1-16
ROSS, A. FRANK, TOTTINGHAM, W. E., NAGY, RUDOLPH, MAREK, JERRY W., and CLAGETT, CARL O.: A Primary Cause of Darkening in Boiled Potatoes as Revealed by Greenhouse Cultures 177-193

Page

Rotenone—
in petroleum spray oil, effectiveness in California red scale control, experiments 17-25
toxicity—
at various temperature levels, comparison with phenol 76-79
relative—
correlation with temperature, statistical analysis 72-75
effects of change of temperature. W. A. Gersdorff 65-80
to goldfish—
quantitative comparison with phenol 71
relation to temperature 66-71

ROTH, L. F. and RIKER, A. J.:
Influence of Temperature, Moisture, and Soil Reaction on the Damping-Off of Red Pine Seedlings by *Pythium* and *Rhizoctonia* 273-293
Life History and Distribution of *Pythium* and *Rhizoctonia* in Relation to Damping-Off of Red Pine Seedlings 129-148
Seasonal Development in the Nursery of Damping-Off of Red Pine Seedlings Caused by *Pythium* and *Rhizoctonia* 417-431

Scale, California red, effectiveness against of cube resins and nicotine in petroleum spray oil. A. W. Cressman 17-26
SEARLES, ED. M., HARRINGTON, C. D., BRINK, R. A., and EISENHART, C.: Measurement of the Resistance of Peas to Aphids 369-387
Seed formation, in Kentucky bluegrass, type as indicated by nature and extent of variation, and its practical implications. William H. Brittingham 225-264
SIEGLER, E. A.: Apatomical and Other Studies on Mazzard Cherry Seedlings Having Excessive Roots at the Collar Region 1-16
Sinigrin, hydrolysis, determination of allyl isothiocyanate from 58
Sirup, corn, adding to lamb-fattening ration, effect. H. M. Briggs and V. G. Heller 359-367
Skirts, wool-flannel, wear, effect on breaking strength 487, 493-498
Soil—
acidity—
effect upon damping-off of red pine 285-290, 423, 426, 427
relation to occurrence of *Pythium* and *Rhizoctonia* damping-off of red pine seedlings 142, 146
moisture, effect upon damping-off of red pine seedlings, experiments 281-284,
reaction— 421, 422, 426, 427, 428
effect upon damping-off of red pine seedlings, experiments 285-290, 422, 425-426, 427
influence on damping-off of red pine seedlings by *Pythium* and *Rhizoctonia*. L. F. Roth and A. J. Riker 273-293
types, effect on occurrence and development of *Pythium* and *Rhizoctonia* fungi on red pine seedlings, inoculation studies 143-146
Solanum tuberosum. *See* Potato; Potatoes.
Solar radiation. *See* Radiation, solar.
Sorghum vulgare var. *sudanense*—
hydrocyanic acid in, environmental, breeding, and inheritance studies. Peter G. Hogg and H. L. Ahlgren 195-210
See also Sudan grass.
Spraying, lemon trees, against California red scale, experiments 17-25
STAHMANN, MARK A., LINK, KARL PAUL, and WALKER, J. C.: Mustard Oils in Crucifers and Their Relation to Resistance to Clubroot 49-63
Starch content of—
potatoes, grown in Kansas, influence of various factors. H. N. Barham, George Kramer, and G. Nathan Reed 395-406
sweetpotatoes grown in Kansas, influence of various factors. H. N. Barham, George Kramer, and G. Nathan Reed. 395-406
STEVENSON, DONALD D., and MEYER, H. ARTHUR: The Structure and Growth of Virgin Beech-Birch-Maple-Hemlock Forests in Northern Pennsylvania 465-484

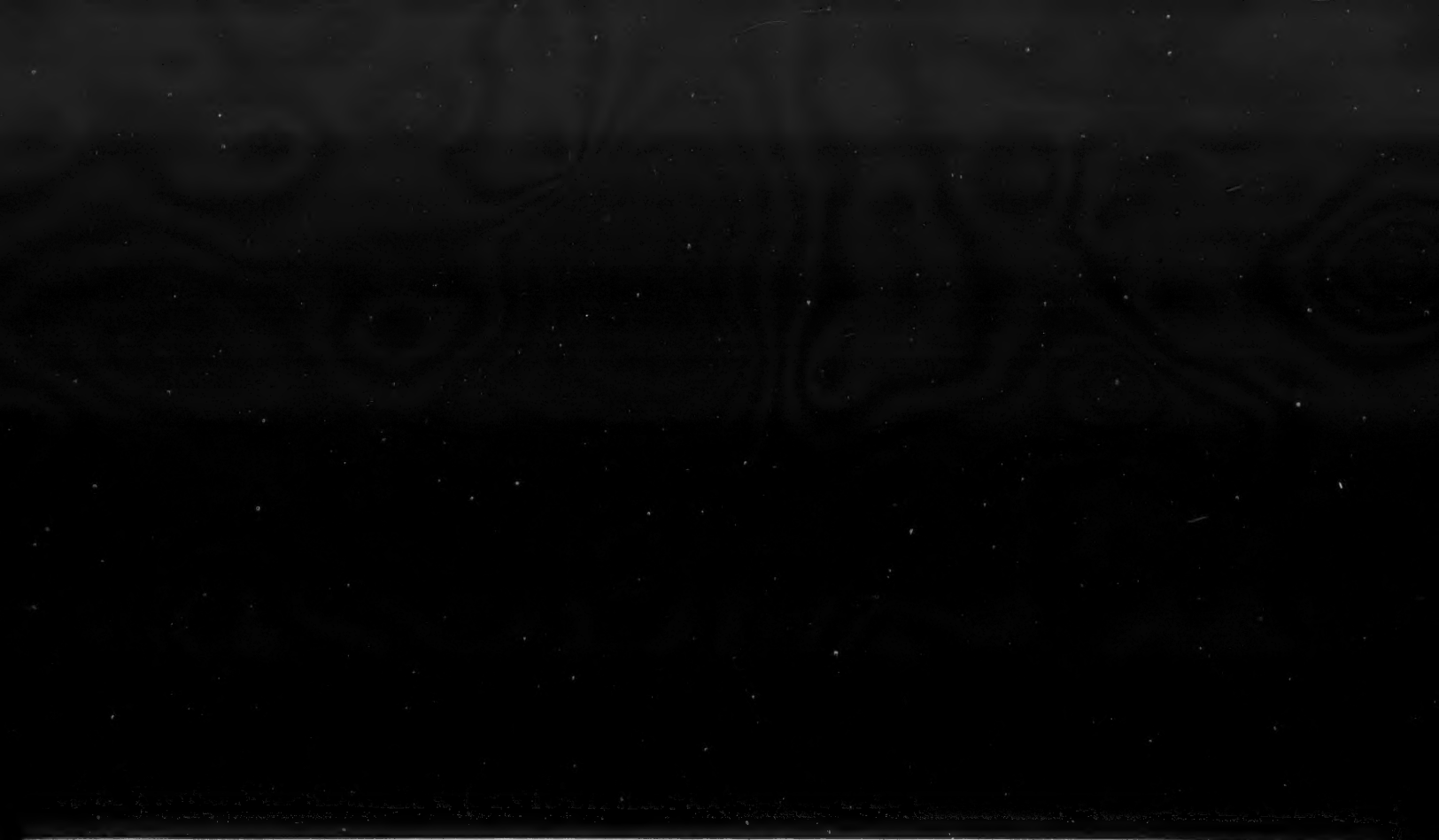
Page

Stinkbug, Say, ability to damage sugar beets grown for seed, comparison with *Lygus* spp. Orin A. Hills 389-394
Storage conditions, effects on tobacco-seed viability. Randall R. Kincaid 407-410
Sucrose—
adding to lamb-fattening ration, effect. H. M. Briggs and V. G. Heller 359-367
concentration in sugar beets 436-438, 442-443
utilization by sugar beet 443-444
Sudan grass—
breeding, methods 201-202
hydrocyanic acid content—
diurnal variation 199-200
effect of drought 199
environmental, breeding, and inheritance studies 195-209
influence of environmental factors 199-201
inheritance studies 201-208
regional variation 200-201
sampling technique 197-199
yearly variation 202-203
inbreeding, effect on yield 203-204
inheritance of hydrocyanic acid, experiments 206-208
strains of uniform hydrocyanic acid content, development 204-206
Sugar, feeding to lambs, effect on utilization of fattening ration 359-366
Sugar beet—
chemical relations—
during developmental phases. Ray C. Chandler 433-445
study methods 434-436
study, results 436-442
trend, significance 442
reducing sugars, function in plant economy 442
reproduction, processes involved 442-444
root, chemical relations 443-444
Sugar beets grown for seed, damage caused by *Lygus* and Say stinkbug. Orin A. Hills 389-394
Sugar, reducing, behavior in sugar beet, variation 436
Sun, artificial, construction and principle of operation 151-163
SUNESON, C. A., and NOBLE, W. B.: Differentiation of the Two Genetic Factors for Resistance to the Hessian Fly in Dawson Wheat 27-32
Sweetpotato, starch content, influence of variety, harvest period, and soil type, experiments 404-405
Sweetpotatoes, Kansas-grown, starch content, influence of various factors. H. N. Barham, George Kramer, and G. Nathan Reed 395-406

Temperature—
change, effects on relative toxicity of rotenone and phenol. W. A. Gersdorff 65-80
effect on—
chemical processes in sugar beet 444
damping-off of red pine seedlings, experiments 277-281, 421-422, 426, 427, 428-429
flowering of lespedeza, determination 266
germination of red pine seed inoculated with damping-off fungi, tests 276-277
influence on damping-off of red pine seedlings by *Pythium* and *Rhizoctonia*. L. F. Roth and A. J. Riker 273-293
relations, effect upon vegetative and reproductive development of sugar beet 433-445
Tenebrio molitor, Malpighian tubes, arsenic excretion by. Robert L. Patton 411-415
Tetraploidy in cabbage, physiological aspects. C. G. Barr and E. H. Newcomer 329-336
Texas, plum—
breeding problems 337
varieties, commercial and home orchards, percentage of normal pollen 338-339
Thiamine—
content of—
crown gall and healthy stem tissues, comparison 100-102
galls from virulent and partly attenuated bacterial cultures 104
inoculated and control tomato plants, comparison 102-103

Thiamine—Continued. Page
content of—continued.
tomato plants grown above and below maximum temperature for gall formation 103–104
virulent and partly attenuated *Phytomonas tumefaciens* bacteria, comparison 105
distribution in inoculated tomato plants in crown gall as measured with the *Phycomyces* assay. Berch W. Henry, A. J. Riker, and B. M. Duggar 89–110
Timber, pine, cutting intensity, influence upon net rainfall under 502–512
Tobacco—
cigar-wrapper, seed, longevity, effects of storage, tests 407–410
from Australia, response to length of day, experiments 459–464
seed, viability, effects of storage conditions. Randall R. Kincaid 407–410
Tomato crown gall, thiamine in, measurement by *Phycomyces* assay 91–108
TOMES, M. L., and FLORY, W. S., JR.: Studies of Plum Pollen, Its Appearance and Germination 337–358
TOTTINGHAM, W. E., NAGY, RUDOLPH, ROSS, A. FRANK, MAREK, JERRY W., and CLAGETT, CARL O.: A Primary Cause of Darkening in Boiled Potatoes as Revealed by Greenhouse Cultures 177–193
Toxicity, relative—
definition 79
of rotenone and phenol, effects of change of temperature. W. A. Gersdorff 65–80
Turnip—
resistance to clubroot, relation to mustard oil content, experiments 50–61
root tissue, myrosin activity, determination 58–60
tissue, mustard oil content, quantitative estimation 55–56
Twig-infesting larvae of oriental fruit moth, parasitization, relation to infestation of ripe peaches. H. W. Allen 81–110

WALKER, J. C., STAHMANN, MARK A., and LINK, KARL PAUL: Mustard Oils in Crucifers and Their Relation to Resistance to Clubroot 49–63

Page
WARD, HELEN M., and BAILEY, BARBARA: Wearing Tests on Fabric Blends of New and Reclaimed Wool Fiber 485–500
Wearing tests, fabric blends of new and reclaimed wool fiber. Helen M. Ward and Barbara Bailey 485–500
Weather, changing, effect upon activity of damping-off fungi 427–429
Wheat—
back crosses, resistance to hessian fly, study 27–32
breeding for resistance to hessian fly 27–32
Dawson, resistance to hessian fly, differentiation of two genetic factors. W. B. Noble and C. A. Sunesson 27–32
hybrids, resistance to hessian fly, study 27–32
WILM, H. G.: Determining Net Rainfall Under a Conifer Forest 501–512
Wind—
effect on moisture equilibria of irradiated forest fuels 164–166
relation to temperature difference of forest fuel and air 158–160
Wisconsin—
forest nurseries, damping-off, seasonal development 417–431
red pine seedlings, damping-off—
relation of *Pythium* and *Rhizoctonia* to 129–147
studies 273–292, 417–431
solar radiation, values, 1934–39 179
Sudan grass, hydrocyanic acid content, studies 195–209
weather, 1928–32 177–178
Wool—
fabric blends—
chemical analysis after total wearing period 488–489, 493–499
comparison with new wool fibers 488–492
storage effects 493
fiber, new and reclaimed, fabric blends of, wearing tests. Helen M. Ward and Barbara Bailey 485–500
flannel fabrics—
bursting-strength, determination methods 487–488
physical measurements 487–488
"reprocessed," definition 486

ZAUMEYER, W. J., and HARTER, L. L.: Inheritance of Symptom Expression of Bean-Mosaic Virus 4 295–300
Two New Virus Diseases of Beans 305–328